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clearer if the confined gas be reduced to approximately a half, a third, or a quarter, than if a smaller or a more closely accurate measurement be attempted.

3. *The Formula*.—Over and over I find pupils using formulas and securing correct answers to problems without any definite comprehension of the meaning of the formula, the principles and phenomena involved, or of the answer obtained. I might give many illustrations drawn from experience, but he is a fortunate and an excellent teacher who can not secure illustrations by asking his own pupils for explanations in clear, understandable, everyday English. Teachers do not appear to realize that a formula is an instrument to save thinking, and that its use very soon becomes purely mechanical, as in the case of any rule-of-thumb process. In the hands of a beginner it is a dangerous tool if he is expected to become an intelligent, independent man rather than a mere workman.

4. *Technical Terms*.—These employed to the usual extent are the most dangerous of all instruments in their possible effects. More time is wasted in science classes in mere dictionary work than one can realize unless he has had opportunity for extended observation. Instead of starting with the phenomenon, the thing itself, and gradually reaching a point of understanding such that a single word may be used instead of a group to express a thought and still keep the thought in mind, the teacher is all too likely to begin with the technical word and attempt to work backward in getting at the idea. Here again is the failure to understand that the symbol is a time-saving device, and that it is utterly useless without the clear idea always back of it. The accumulation of the mass of technical terms in the most of our secondary science teaching is almost appalling,

and it is no wonder that so many pupils emerge at the end of the study in the bewildered condition indicated by the examination tests.

Physics is a study most wonderful in its possibilities, and I sincerely hope that in the near future the work may be so modified that its usefulness will appeal to our students so strongly that we may be able to resist the demand that it be made an optional study.

The average American young person is very unwilling to give up what he considers his birthright, the opportunity for a higher education; and he submits to much that is distasteful and to much which he instinctively feels is inappropriate or useless rather than to forfeit a chance of satisfying what may be an ambition in the future. Must it continue necessary, in order to fit for college, that the four great instruments for giving that preparation shall continue to be "Instruments of Confusion"?

H. L. TERRY

STATE DEPARTMENT OF EDUCATION,  
MADISON, WIS.

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THE RESIGNATION OF PRESIDENT  
NEEDHAM

DR. CHARLES W. NEEDHAM has resigned the presidency of George Washington University. In his letter to the trustees he says:

After eight years of service as president I offer my resignation of this high office. This I do from a keen sense of personal loyalty to the institution. Difficulties have arisen which, in my own opinion and in the opinion of some of my friends in whom I have the greatest confidence, can only be solved by a man coming to this office who can undertake the task free from all connection with the past. It therefore becomes my duty to make clear the way for the appointment of such a man.

In accepting the resignation the trustees passed the following resolution:

*Resolved*, That the resignation of Dr. Charles Willis Needham as the president of this univer-

sity, presented to this board by his letter of resignation at the meeting held on April 27 last, be and the same is hereby accepted, to take effect on August 31, 1910.

*Resolved*, That in accepting the resignation of Dr. Needham, the trustees desire to express their high appreciation of his intelligent and laborious services in upbuilding the university and raising its standards, and their regret that it has now become necessary, in his opinion, for him to relinquish into other hands the guidance of the affairs of the institution, in the management of which he has for the past eight years participated jointly with the other members of the several boards of trustees. In all these years he has labored with an eye single to the highest good of the university and with a clear conception of its usefulness to the national capital and therefore to the nation. He has shown great intelligence, unselfish devotion, fine courage, patience and manly courtesy even under the most trying circumstances. They extend to him as he is laying down the heavy burdens of the high office which he has held, their sincere good wishes.

They further desire to place on record their concurrence in the policy of keeping the institution up to the rank of a university, and their belief that the educational organization formed under his direction is a substantial foundation upon which to establish a university adapted to conditions at the seat of government.

#### SCIENTIFIC NOTES AND NEWS

THE subject of Mr. Roosevelt's Romanes lecture, to be given at Oxford, will be "Biological Analogies in History."

DR. EDWARD M. GALLAUDET, for the past fifty-three years president of the Columbian Institution for the Deaf and Dumb, commonly known as Gallaudet College, has resigned as president of the institution, his resignation to take effect on September 15. Dr. Gallaudet was born on February 5, 1837.

A TESTIMONIAL dinner in honor of Dr. James Tyson was given in Philadelphia on May 5, on the occasion of his retirement from the professorship of medicine of the University of Pennsylvania.

DR. WILLIAM H. PARK, professor of bacteriology and hygiene in the University and Bellevue Hospital Medical College, has been

given the degree of doctor of laws by Queen's University at Kingston, Ont.

THE Samuel D. Gross prize of the Philadelphia Academy of Surgery for 1910, amounting to \$1,500, has been awarded to Dr. A. P. C. Ashhurst, of Philadelphia, for an essay entitled, "An Anatomical and Surgical Study of Fractures of the Lower End of the Humerus."

WE learn from *Nature* that the Geological Society of France has this year awarded its Danton prize to M. Gosselet. The prize is given to the geologist whose discoveries are likely to benefit industry most, and was awarded to M. Gosselet for the part he has taken in the development of coal-mining in the north of France. The Viquesnel prize, intended to encourage geological research, has been awarded to M. Robert Douvillé for his stratigraphical work on the geology of Spain and his paleontological researches on the foraminifera and ammonites.

THE *Medical Record* calls attention to the fact that with the assumption by General Leonard Wood, of the office of chief of staff of the U. S. Army and the advancement of Major-General F. C. Ainsworth to become ranking major-general, the two highest positions in the army are held by physicians who entered the line from the medical service. General Wood was graduated from the Harvard Medical School in 1884. General Ainsworth was graduated from the medical department of the New York University in 1874.

THE association medal of the National Association of Cotton Manufacturers was awarded at its eighty-eighth meeting, on April 27, to Dr. C. J. H. Woodbury for his Bibliography on the Cotton Manufacture, and also for services to this industry. This medal was established in 1895, and the act governing its award states: It is the purpose of the board of government that this medal may be given to any person whose work has been, in their opinion, and advantage of sufficient importance to the purposes to which this organization is devoted in its broadest sense, in-